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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
RASHID, DAVID	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/533,385	PARK ET AL.	
	Examiner	Art Unit	
	DAVID P. RASHID	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21-32 and 34-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-32 and 34-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

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Efficient Use of MPEG-7 Edge Histogram Descriptor, vol. 24, no. 1, 2/2002 ('Won') 5

Continued Examination Under 37 C.F.R. § 1.114

[1] A request for continued examination under 37 C.F.R. § 1.114, including the fee set forth in 37 C.F.R. § 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 C.F.R. § 1.114, and the fee set forth in 37 C.F.R. § 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 C.F.R. § 1.114. Applicant's submission filed on Sep. 1, 2009 has been entered.

Amendments & Claim Status

[2] This office action is responsive to Amendment and Response to Final Office Action ("Amendment") received Jul. 31, 2009 and Declaration Under 37 C.F.R. § 1.132 (the "affidavits") received Jul. 31, 2009. Claims 21-32 and 34-38 remain pending; claims 1-20 and 39-41 withdrawn; claim 39 cancelled.

Claim Rejections - 35 U.S.C. § 101

[3] In response to Amendment, the previous 35 U.S.C. § 101 rejections are withdrawn.

Response to Arguments

Remarks Unpersuasive regarding Rejections Under 35 U.S.C. § 103

[4] Amendment at 14-15 regarding 35 U.S.C. § 103 rejections as being unpatentable over Park in view of Won with respect to claims 21-32 and 34-38 have been respectfully and fully considered, but are not found persuasive.

> The Examiner recognizes that Park does not disclose the limitations of Claim 21, but relies on Won for supplying the missing elements in Park.
>
> Applicants submit that Won is disqualified as a prior art reference. Applicants submit herewith declarations from each of the five inventors of the present application, which includes Sung-Hee Park, Soo-Jun Park, Myung-Gil Jang, Sang-Kyu Park and Chee-Sun Won. Under MPEP §716.10, when the authorship of a cited reference is an entity different from the inventorship of an application (i.e., the above-identified five inventors), an affidavit or declaration under 37 C.F.R. § 1.132 may be submitted to show that the relevant portions of the cited reference originated with or were obtained from Applicants. Applicants respectfully request the Examiner refer to MPEP 716.10 Attribution, Example 2, which states the situation wherein "the author or patentee is an entity different from applicant". Based on the declarations filed herewith, Won is Applicants' own work and, therefore, cannot be used as a prior art reference in the rejection of the pending claims.

Amendment at 14-15.

The affidavits received Jul. 31, 2009 amount to Sung-Hee Park, Soo-Jun Park, Myung-Gil Jang, Sang-Kyu Park and Chee-Sun Won (all the inventors of the present application) declaring that the portions of the Won reference relevant to Claims 1-38 of the present application "originated with or were obtained from them".

However, the affidavits are insufficient for the following reasons (including reliance upon M.P.E.P. § 716.10):

(i) Dong Park is listed as an inventor in the Wong reference. Dong Park may have also contributed to the relevant portions to Claims 1-38 of the present application in the Wong reference. The affidavits to not exclude such possibility, and thus though the relevant portions to Claim 1-38 were originated by the inventors of the present application (Dong Park included), the inventorship is then by "another" because these two inventive entities are different (i.e., each composed of a different set of inventors). <u>See</u> § 2132.01 (citing specifically "whose authorship differs in any way from the inventive entity").

It cannot be positively inferred from the affidavits and the inventorship of the Wong reference that Dong Park did not also contribute to the relevant portions to Claims 1-38.

(ii)

> However, it is incumbent upon the inventors named in the application, in response to an inquiry regarding the appropriate inventorship under 35 U.S.C. 102(f) or to rebut a rejection under 35 U.S.C. 102(a) or (e), to provide a satisfactory showing by way of affidavit under 37 CFR 1.132 that the inventorship of the application is correct in that the reference discloses subject matter derived from the applicant rather than invented by the author, patentee, or applicant of the published application notwithstanding the authorship of the article or the inventorship of the patent or published application. In re Katz, 687 F.2d 450, 455, 215 USPQ 14, 18 (CCPA 1982) (inquiry is appropriate to clarify any ambiguity created by an article regarding inventorship and it is then incumbent upon the applicant to provide "a satisfactory showing that would lead to a reasonable conclusion that [applicant] is the ... inventor" of the subject matter disclosed in the article and claimed in the application).

M.P.E.P. § 716.10.

The affidavits do not show "a satisfactory showing that would lead to a reasonable conclusion that [applicant] is the ... inventor" of the subject matter disclosed in the article and claimed in the application". Id. "[T]o provide a satisfactory showing by way of affidavit under 37 CFR 1.132 that the inventorship of the application is correct in that the reference discloses subject matter derived from the applicant rather than invented by the author, patentee, or applicant of the published application notwithstanding the authorship of the article or the inventorship of the patent or published application". Id (emphasis added).

For example, In re Katz was an application with a solve inventor Katz of the claimed subject matter. Its 102(a) prior art rejection was of a reference whose "inventorship" was students (A and B) and Katz. Katz properly demonstrated that the students were not co-inventors of the subject matter relevant to the claims in the 102(a) prior art (by indicating that the students were only students who helped assist Katz, but were not co-inventors of the relevant subject matter).

The affidavits submitted by Applicant do not indicate any reasoning why (i) Don Park is not related to the subject matter as claimed in Claim 1-38 of the present application in the Wong reference (e.g., Don Park was a student who helped assist in making the publication, but did not contribute to the subject matter as claimed in Claim 1-38 of the present application); and (ii) Sung-Hee Park, Myung-Gil Jang, and Sang-Kyu Park are related to the subject matter as claimed in Claim 1-38 of the present application in the Wong reference. Because of no indication, the inventorship may be by "another" because these two inventive entities are different (i.e., each

composed of a different set of inventors). See § 2132.01 (citing specifically "whose authorship differs in any way from the inventive entity").

Claim Rejections - 35 U.S.C. § 103

[5] The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Park in view of Won

[6] **Claims 21-32** and **34-38** are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination between "Efficient Use of Local Edge Histogram Descriptor", Proceedings ACM Multimedia 2000 Workshops, 11/4/2000, ACM International Multimedia Conference ("Park") in view of Efficient Use of MPEG-7 Edge Histogram Descriptor, vol. 24, no. 1, 2/2002 ("Won").

Regarding **claim 21**, while Park discloses a method for retrieving a corresponding video sequence ("MPEG-7" at s. 5, p. 53, right column) having a set of image frames ("11639 images" at s. 5, p. 53, right column) of the digital video data ("MPEG-7" at s. 5, p. 53, right column) from a database ("database" at s. 5, p. 53, right column) in response to a query video sequence ("query images" at s. 5, p. 53),

the method comprising the steps of:

a) calculating, by a computer[1], L representative edge histograms ("edge histogram" at s. 2.2, p. 52; e.g., L being 80 / 5 = 16 as calculated from table 1) of the query video sequence ("query images" at s. 5, p. 53, right column) as an image descriptor ("edge histogram descriptor" at s. 2.2, p. 52, left column) for the query video sequence, wherein each representative edge

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[1 1] See MPEP § 2144.01 (citing "[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968)...").

One skilled in the art would reasonably be expected to draw that the method of claim 21 is performed on a computer, as supported at the use of MPEG-7 and the high number of computations needed in Park.

histogram represents a representative spatial distribution of 5 reference edges (fig. 2a-e, left column) in sub-images of image frames in the query video sequence, wherein the reference edges includes 4 directional edges (fig. 2a-d; "[s]emantics at table 1", left column) and a non-directional edge (fig. 2e, left column);

b) extracting, by the computer, a plurality of image descriptors ("edge histogram descriptor" at s. 1, p. 51, left column) for video sequences based on digital video data information from the database, wherein each image descriptor for said each video sequence includes L representative edge histogram bins ("five histogram bins for each sub-image" at s. 2.3, p. 52; "80 histogram bins" at s. 1, p. 51; table 1) for said each video sequence;

c) comparing, by the computer, the image descriptor ("edge histogram descriptor" at s. 1, p. 51, left column) for the query video sequence ("query images" at s. 5, p. 53, right column) to said each image descriptor ("edge histogram descriptor" at s. 2.2, p. 52, left column) for each video sequences ("MPEG-7" at s. 5, p. 53, right column) to generate a comparison result ("[t]hen, the global, semi-global, and local histograms of two images are compared to evaluate the similarity measure" at abstract), the comparison result indicating a degree of similarity between the query video sequence and the video sequence; and

d) retrieving, by the computer, at least one video sequence based on the comparison results (fig. 8-9; table 2 retrieves at least one video sequence as shown, p. 54),

Park does not disclose wherein the step b) includes the steps of: b1) retrieving L x 5 quantization index values for each of the target video sequence; b2) converting each of the L x 5 quantization index values into L x 5 representative edge histogram bins for said each target vides sequence by using 5 non-linear inverse quantization tables; and b3) generating L representative edge histograms based on the L x 5 normalized edge histogram bins.

Won teaches wherein the step b) includes the steps of:

b1) retrieving L x 5 quantization index values (table 1, p. 25, left column lists 13 x 5, the semantics being the quantization index values) for each of the target video sequence ('images or video" at abstract, p. 23);

b2) converting each of the L x 5 quantization index values into L x 5 representative edge histogram bins (histogram bins listed in table 1, p. 25, left column) for said each target vides sequence by using 5 non-linear inverse quantization tables ("[t]he normalized 80 bin values are

nonlinearly quantized and fixed length coded with 3birts/bin as defined in Table 2. . ." at p. 25); and

b3) generating L number of representative edge histograms (e.g., table 3, p. 27, right column generates the L number based on the edge histogram bins) based on the L x 5 normalized edge histogram bins.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the method of Park to include wherein the step b) includes the steps of: b1) retrieving L x 5 quantization index values for each of the target video sequence; b2) converting each of the L x 5 quantization index values into L x 5 representative edge histogram bins for said each target vides sequence by using 5 non-linear inverse quantization tables; and b3) generating L number of representative edge histograms based on the L x 5 normalized edge histogram bins as taught by Won since "using the local histogram bins only may not be sufficient to represent global features of the edge distribution. Thus, to improve the retrieval performance, we need global edge distribution as well. This paper describes how to generate the semi-global and global edge histograms from the local histogram bins. Then, the global, semi-global, and local histogram bins are used to evaluate the similarity between images." Won at s. I, P. 23.

Regarding **claim 22**, Park wherein said each edge histogram has 5 edge histogram bins (e.g., Local-Edge[0] though Local-Edge[4] at table 1, p. 52, left column) corresponding to the reference edges (the reference edges given in Local-Edge[0] though Local-Edge[4] at table 1, p. 52, left column; e.g., Vertical edge of sub-image at (0,0)).

Regarding **claim 23**, Park discloses wherein the directional edges (fig. 2a-d, p. 52, left column; "[s]emantics at table 1") include a vertical edge, a horizontal edge, a 45 degree edge, a 135 degree edge and the non-directional edge (*see* "[s]emantics at table 1" for all 5 categories, p. 52, left column) represents an edge of undesignated direction except for the 4 directional edges.

Regarding **claim 24**, Park discloses wherein the step a) includes steps of:

a1) partitioning each image frame of query video sequence into L sub images (e.g., "4 x 4 = 16 sub-images" at s. 2.3, p. 52, left column wherein 16 = L), wherein each sub-image is further partitioned into S x T image-blocks (s. 3, p. 52, left column; e.g., "image-block" at fig. 3), L, S and T being positive integers;

a2) assigning one of 5 reference edges (one of the five is selected; “for each sub-image, we generate an edge histogram” at s. 2.1, p. 51, right column) to each image-block (s. 3, p. 52; e.g., “image-block” at fig. 3, right column) to thereby generate L edge histograms (“edge histogram” at s. 2.3, p. 52, left column) for each image frame, wherein the edge histograms include M edge histogram bins (e.g., “16x5=80 bins for the edge histogram” at s. 2.3, p. 52, left column) and the reference edges include 4 directional edges and a non-directional edge;

a3) normalizing the edge histogram bins (“normalize each bin in the histogram” at s. 2.4, left column) contained in each edge histogram by S x T to thereby generate M normalized edge histogram bins (“five histogram bins for each sub-image” at s. 2.3, p. 52, left column; “80 histogram bins” at s. 1, p. 51; table 1, left column) for said each image frame;

a4) calculating M representative edge histogram bins (e.g., first five semantics in table 1, left column) of said query video sequence in order to generate L representative edge histograms (edge histogram" at s. 2.2, p. 52, left column) of each video sequence based on the normalized edge histogram bins (“five histogram bins for each sub-image” at s. 2.3, p. 52, left column; “80 histogram bins” at s. 1, p. 51, right column; table 1) of said each image frames

Regarding **claim 25**, Park does not disclose wherein the step a2) includes the steps of: a2-1) assigning one of the reference edges to each image block; and a2-2) counting the number of each reference edge included in each sub-image to generate the L number of the edge histograms for the query video sequence.

Won teaches wherein a step a2) includes the steps of:

a2-1) assigning one of the reference edges to each image block ("each image block is classified into one of thee 5 types of edge blocks or a nonedge block” at s. II, p. 25, left column); and a2-2) counting the number of each reference edge included in each sub-image (“[w]ithin each sub-image the edge types are arranged in the following order. . ." at s. II, p. 24, left column) to generate the L number of the edge histograms (e.g., L being 80 / 5 = 16 edge histograms as calculated from table 1) for the query video sequence.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the step a2) of Park to include the steps of: a2-1) assigning one of the reference edges to each image block; and a2-2) counting the number of each reference edge included in each sub-image to generate the L number of the edge histograms for the query video sequence as

taught by Won since "using the local histogram bins only may not be sufficient to represent global features of the edge distribution. Thus, to improve the retrieval performance, we need global edge distribution as well. This paper describes how to generate the semi-global and global edge histograms from the local histogram bins. Then, the global, semi-global, and local histogram bins are used to evaluate the similarity between images. " (Won at s. I, P. 23)

Regarding **claim 26**, Park in view of Won does not disclose wherein the step a2-1) includes the steps of: a2-11) dividing each image-block into 2.times.2 sub-blocks; a2-12) assigning a corresponding filter coefficient to each sub-block; a2-13) calculating a set of 5 edge magnitudes corresponding to five edges for each image-block by using the filter coefficient; and a2-14) expressing the image-block as an edge having a maximum edge magnitude by comparing the calculated edge magnitudes each other.

Won teaches wherein a step a2-1) includes the steps of:

a2-11) dividing each image-block into 2.times.2 sub-blocks (fig. 5, p. 26, left column);

a2-12) assigning a corresponding filter coefficient (fig. 6a-e, p. 26, right column) to each sub-block;

a2-13) calculating a set of 5 edge magnitudes ("edge magnitudes. . .(containing 5)" at s. III, p. 25, right column) corresponding to five edges for each image-block by using the filter coefficient (fig. 6a-e); and

a2-14) expressing the image-block (fig. 5 image block, p. 26, left column) as an edge having a maximum edge magnitude by comparing the calculated edge magnitudes each other ("maximum value among 5 edge strengths. . ." at s. III, p. 26; equation (6) at p. 26, left column).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the step a2-1) of Park in view of Won to include the steps of: a2-11) dividing each image-block into 2.times.2 sub-blocks; a2-12) assigning a corresponding filter coefficient to each sub-block; a2-13) calculating a set of 5 edge magnitudes corresponding to five edges for each image-block by using the filter coefficient; and a2-14) expressing the image-block as an edge having a maximum edge magnitude by comparing the calculated edge magnitudes each other as taught by Won since "using the local histogram bins only may not be sufficient to represent global features of the edge distribution. Thus, to improve the retrieval performance, we need global edge distribution as well. This paper describes how to generate the semi-global and global

edge histograms from the local histogram bins. Then, the global, semi-global, and local histogram bins are used to evaluate the similarity between images. " (Won at s. I, P. 23)

Regarding **claim 27**, Park in view of Won does not disclose wherein the 5 edge magnitudes are obtained by using 5 equations, which are expressed as:

$$m_v(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_v(k) \right|;$$

$$m_h(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_h(k) \right|;$$

$$m_{d-45}(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_{d-45}(k) \right|;$$

$$m_{d-135}(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_{d-135}(k) \right|; \text{ and}$$

$$m_{nd}(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_{nd}(k) \right|, \text{ where } m_v(i,j),\ m_h(i,j),\ m_{d-45}(i,j),$$

respectively, respectively, denote vertical, horizontal, 45 degree, 135 degree and non-directional edge magnitudes for a $(i,j)^{th}$ image-block; $a_k(i,j)$ denotes an average gray level for a sub-block assigned k in the $(i,j)^{th}$ image-block and $f_v(k)$, $f_h(k)$, $f_{d-45}(k)$, $f_{d-135}(k)$ and $f_{nd}(k)$ denote, respectively, filter coefficients for the vertical, horizontal, 45 degree, 135 degree and non-directional edges where k represents a number assigned to each sub-block.

Won teaches wherein the 5 edge magnitude are obtained by using 5 equations, which are expressed as:

$$m_v(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_v(k) \right|;$$

$$m_h(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_h(k) \right|;$$

$$m_{d-45}(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_{d-45}(k) \right|;$$

$$m_{d-135}(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_{d-135}(k) \right|; \text{ and}$$

$$m_{nd}(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_{nd}(k) \right|, \text{ where } m_v(i,j),\ m_h(i,j),\ m_{d-45}(i,j),$$

(equations (1)-(5) at p. 26, left column) respectively, denote vertical, horizontal, 45 degree, 135 degree and non-directional edge magnitudes for a $(i,j)^{th}$ image-block; $a_k(i,j)$ denotes

an average gray level for a sub-block assigned k in the $(i,j)^{th}$ image-block and $f_v(k)$, $f_h(k)$, $f_{d-45}(k)$, $f_{d-135}(k)$ and $f_{nd}(k)$ denote, respectively, filter coefficients for the vertical, horizontal, 45 degree, 135 degree and non-directional edges where k represents a number assigned to each sub-block (last paragraph on p. 25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the 5 edge magnitudes of Park in view of Won to be are obtained by using 5 equations, which are expressed as:

$$m_v(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_v(k) \right|;$$

$$m_h(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_h(k) \right|;$$

$$m_{d-45}(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_{d-45}(k) \right|;$$

$$m_{d-135}(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_{d-135}(k) \right|; \text{ and}$$

$$m_{nd}(i,j) = \left| \sum_{k=0}^{3} a_k(i,j) \times f_{nd}(k) \right|, \text{ where } m_v(i,j),\ m_h(i,j),\ m_{d-45}(i,j),$$

respectively, respectively, denote vertical, horizontal, 45 degree, 135 degree and non-directional edge magnitudes for a $(i,j)^{th}$ image-block; $a_k(i,j)$ denotes an average gray level for a sub-block assigned k in the $(i,j)^{th}$ image-block and $f_v(k)$, $f_h(k)$, $f_{d-45}(k)$, $f_{d-135}(k)$ and $f_{nd}(k)$ denote, respectively, filter coefficients for the vertical, horizontal, 45 degree, 135 degree and non-directional edges where k represents a number assigned to each sub-block as taught by Won since "using the local histogram bins only may not be sufficient to represent global features of the edge distribution. Thus, to improve the retrieval performance, we need global edge distribution as well. This paper describes how to generate the semi-global and global edge histograms from the local histogram bins. Then, the global, semi-global, and local histogram bins are used to evaluate the similarity between images. " (Won at s. I, P. 23)

Regarding **claim 28**, Park in view of Won does not disclose wherein the maximum edge magnitude is greater than a predetermined threshold value, otherwise the image block is considered to contain no edge.

Won teaches wherein the maximum edge magnitude is greater than a predetermined threshold value, otherwise the image block is considered to contain no edge ("if the maximum. . .then the image-block is considered. . .[o]therwise, the image-block contains no edge" at p. 26, left column).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the method of Park in view of Won to include wherein the maximum edge magnitude is greater than a predetermined threshold value, otherwise the image block is considered to contain no edge as taught by Won since "using the local histogram bins only may not be sufficient to represent global features of the edge distribution. Thus, to improve the retrieval performance, we need global edge distribution as well. This paper describes how to generate the semi-global and global edge histograms from the local histogram bins. Then, the global, semi-global, and local histogram bins are used to evaluate the similarity between images. " (Won at s. I, P. 23)

Regarding **claim 29**, Park does not disclose wherein the image descriptors for the query and target video sequence further include a global edge histogram and R the semi-global histograms based on the L 5 representative edge histogram bins, respectively, R being a positive integer.

Won teaches wherein the image descriptors ("MPEG-7 standard descriptor" at s. II, p. 24) for the query and target video sequence ("ground truth images for each query image" at s. IV, p. 27; e.g., fig. 10 query and target video sequences) further include a global edge histogram ("global edge histogram" at s. IV, p. 27) and R the semi-global histograms based on the L x 5 representative edge histogram bins ("the global edge histogram has 5 bins and each bin value is obtained by . . .bin values of the corresponding edge type of BinCounts[]" at s. IV, p. 27, left column), respectively, R being a positive integer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the image descriptors for the query and target video sequence of Park to further include a global edge histogram and R the semi-global histograms based on the L 5 representative edge histogram bins, respectively, R being a positive integer as taught by Won since "using the local histogram bins only may not be sufficient to represent global features of the edge distribution. Thus, to improve the retrieval performance, we need global edge

distribution as well. This paper describes how to generate the semi-global and global edge histograms from the local histogram bins. Then, the global, semi-global, and local histogram bins are used to evaluate the similarity between images. " (Won at s. I, P. 23)

Regarding **claim 30**, Park in view of Won does not disclose wherein the global edge histogram represents an edge distribution in a whole space of the query and target video sequences and each semi-global edge histogram represents an edge distribution in a corresponding set of sub-images of the query and target video sequences.

Won teaches wherein the global edge histogram ("semi-global edge histograms" at pp. 26-27) represents an edge distribution in a whole space of the query and target video sequences ("edge distribution information for the whole image space and. . ." at pp. 26-27) and each semi-global edge histogram ("semi-global edge histograms" at pp. 26-27) represents an edge distribution ("represents the edge distribution for the whole image space" at p. 27) in a corresponding set of sub-images (e.g., sub-images at fig. 8) of the query and target video sequences.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the global edge histogram of Park in view of Won to include an edge distribution in a whole space of the query and target video sequences and each semi-global edge histogram represents an edge distribution in a corresponding set of sub-images of the query and target video sequences as taught by Won since "using the local histogram bins only may not be sufficient to represent global features of the edge distribution. Thus, to improve the retrieval performance, we need global edge distribution as well. This paper describes how to generate the semi-global and global edge histograms from the local histogram bins. Then, the global, semi-global, and local histogram bins are used to evaluate the similarity between images. " (Won at s. I, P. 23)

Regarding **claim 31**, Park in view of Won does not disclose wherein said N and R are 4 and 13, respectively.

Won teaches wherein N and R are 4 (each segment for semi-global histograms has four sub-images as shown in fig. 8; 4 sub-blocks at fig. 5) and 13 ("13 different subsets of the image-blocks" at p. 27, left column; fig. 8), respectively.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the method of Park in view of Won to include wherein said N and R are 4 and 13,

respectively as taught by Won since "using the local histogram bins only may not be sufficient to represent global features of the edge distribution. Thus, to improve the retrieval performance, we need global edge distribution as well. This paper describes how to generate the semi-global and global edge histograms from the local histogram bins. Then, the global, semi-global, and local histogram bins are used to evaluate the similarity between images. " (Won at s. I, P. 23).

Regarding **claim 32**, Park in view of Won does not disclose wherein each of the 13 semi-global edge histograms is generated for each of 13 sets of 4 sub-images, wherein the 13 sets include: four sets of 4 sub-images, each set including 4 sub-images in each of first to fourth columns of the image in vertical direction; four sets of 4 sub-images, each set including 4 sub-images in each of first to fourth rows in horizontal direction; four sets of 4 sub-images, each set including a corresponding sub-image and 3 sub-images neighboring the corresponding sub-image, wherein the corresponding sub-image is respectively located on the left-top, on the right-top, on the left-bottom and on the right-bottom of the image; and a set including 4 sub-images around the center of the image.

Won teaches wherein each of the 13 semi-global edge histograms (the 13 shown in fig. 8, p. 27) is generated for each of 13 sets of 4 sub-images (each segment for semi-global histograms has four sub-images), wherein the 13 sets include:

four sets of 4 sub-images, each set including 4 sub-images in each of first to fourth columns of the image in vertical direction (left-most figure at fig. 8, p. 27);

four sets of 4 sub-images, each set including 4 sub-images in each of first to fourth rows in horizontal direction (middle figure at fig. 8, p. 27);

four sets of 4 sub-images, each set including a corresponding sub-image and 3 sub-images neighboring the corresponding sub-image, wherein the corresponding sub-image is respectively located on the left-top, on the right-top, on the left-bottom and on the right-bottom of the image; and a set including 4 sub-images around the center of the image (right-most figure at fig. 8, p. 27).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the method of Park in view of Won to include wherein each of the 13 semi-global edge histograms is generated for each of 13 sets of 4 sub-images, wherein the 13 sets include: four sets of 4 sub-images, each set including 4 sub-images in each of first to fourth columns of

the image in vertical direction; four sets of 4 sub-images, each set including 4 sub-images in each of first to fourth rows in horizontal direction; four sets of 4 sub-images, each set including a corresponding sub-image and 3 sub-images neighboring the corresponding sub-image, wherein the corresponding sub-image is respectively located on the left-top, on the right-top, on the left-bottom and on the right-bottom of the image; and a set including 4 sub-images around the center of the image as taught by Won since "using the local histogram bins only may not be sufficient to represent global features of the edge distribution. Thus, to improve the retrieval performance, we need global edge distribution as well. This paper describes how to generate the semi-global and global edge histograms from the local histogram bins. Then, the global, semi-global, and local histogram bins are used to evaluate the similarity between images. " (Won at s. I, P. 23).

Regarding **claim 34**, Park in view of Won does not disclose wherein the step b) further includes the step of: b4) further generating a global edge histogram and R semi-global histograms for each of the target video sequence based on the L x 5 representative edge histogram bins.

Won teaches wherein the step b) further includes the step of:

b4) further generating a global edge histogram ("global edge histogram" at p. 27, left column) and R semi-global histograms (e.g., "semi-global edge histograms of image A and image B, respectively" at p. 27, left column) for each of the target video sequence based on the L x 5 representative edge histogram bins (equation (7) at p .27, left column).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the step b) of Park in view of Won to include the step of: b4) further generating a global edge histogram and R semi-global histograms for each of the target video sequence based on the L x 5 representative edge histogram bins as taught by Won since "using the local histogram bins only may not be sufficient to represent global features of the edge distribution. Thus, to improve the retrieval performance, we need global edge distribution as well. This paper describes how to generate the semi-global and global edge histograms from the local histogram bins. Then, the global, semi-global, and local histogram bins are used to evaluate the similarity between images. " (Won at s. I, P. 23).

Regarding **claim 35**, claim 33 recites identical features as in claim 35. Thus, references/arguments equivalent to those presented above for claim 33 are equally applicable to claim 35.

Regarding **claim 36**, claim 34 recites identical features as in claim 36. Thus, references/arguments equivalent to those presented above for claim 34 are equally applicable to claim 36.

Regarding **claim 37**, Park in view of Won does not disclose wherein the step c) includes the step of: estimating a distance between the query video sequence and said each target video sequence by equation as:

$$Distance(A,B) = \sum_{i=0}^{79} \left| Local\_A[i] - Local\_B[i] \right| + 5 \times \sum_{i=0}^{4} \left| Global\_A[i] - Global\_B[i] \right| + \sum_{i=0}^{64} \left| Semi\_Global\_A[i] - Semi\_Global\_B[i] \right|$$

where Local_A[i] and Local_B[i] denote, respectively, the edge histogram bins of BinCount[i] of the query video sequence A and the target video sequence B; Global_A[ ] and Global_B[ ] denote, respectively, the edge histogram bins for the global edge histograms of the query image A and the target image B; and Semi_Global_A[ ] and Semi_Global_B[ ] denote, respectively, the histogram bin values for the semi-global edge histogram bins of the query video sequence A and the target video sequence B.

Won teaches wherein the step c) includes the step of:

estimating a distance between the query video sequence and said each target video sequence by equation as:

$$Distance(A,B) = \sum_{i=0}^{79} \left| Local\_A[i] - Local\_B[i] \right| + 5 \times \sum_{i=0}^{4} \left| Global\_A[i] - Global\_B[i] \right| + \sum_{i=0}^{64} \left| Semi\_Global\_A[i] - Semi\_Global\_B[i] \right|$$

where Local_A[i] and Local_B[i] denote, respectively, the edge histogram bins of BinCount[i] of the query video sequence A and the target video sequence B; Global_A[ ] and Global_B[ ] denote, respectively, the edge histogram bins for the global edge histograms of the query image

A and the target image B; and Semi_Global_A[ ] and Semi_Global_B[ ] denote, respectively, the histogram bin values for the semi-global edge histogram (p. 27, left column; equation (7), p. 27)

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the step c) of Park in view of Won to include the step of: estimating a distance between the query video sequence and said each target video sequence by equation as:

$$\begin{aligned} Distance(A,B) = \sum_{i=0}^{79} \left| Local\_A[i] - Local\_B[i] \right| + 5 \times \sum_{i=0}^{4} \left| Global\_A[i] - Global\_B[i] \right| \\ + \sum_{i=0}^{64} \left| Semi\_Global\_A[i] - Semi\_Global\_B[i] \right| \end{aligned}$$

where Local_A[i] and Local_B[i] denote, respectively, the edge histogram bins of BinCount[i] of the query video sequence A and the target video sequence B; Global_A[ ] and Global_B[ ] denote, respectively, the edge histogram bins for the global edge histograms of the query image A and the target image B; and Semi_Global_A[ ] and Semi_Global_B[ ] denote, respectively, the histogram bin values for the semi-global edge histogram bins of the query video sequence A and the target video sequence B as taught by Won since "using the local histogram bins only may not be sufficient to represent global features of the edge distribution. Thus, to improve the retrieval performance, we need global edge distribution as well. This paper describes how to generate the semi-global and global edge histograms from the local histogram bins. Then, the global, semi-global, and local histogram bins are used to evaluate the similarity between images. " (Won at s. I, P. 23).

Regarding **claim 38**, claim 37 recites identical features as in claim 38. Thus, references/arguments equivalent to those presented above for claim 37 are equally applicable to claim 38.

Conclusion

[7] Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID P. RASHID whose telephone number is (571)270-1578 and fax number (571)270-2578. The examiner can normally be reached Monday - Friday 7:30 - 17:00 ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-74537453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/David P. Rashid/
Examiner, Art Unit 2624

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